Siliquamomum oreodoxa (Zingiberaceae): a New Species from Southern Vietnam

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Abstract

The second species of *Siliquamomum* (Zingiberaceae), *S. oreodoxa* N.S.Ly & Škorničk., is described as new and illustrated. The two species in the genus are compared and a key is provided for their identification.

Introduction

The genus *Siliquamomum* was described by Baillon (1895) based on a collection made by Benedict Balansa in Lankok valley of Ba Vi Mountain, Tonkin (North Vietnam). The only representative of the genus known till date, *S. tonkinense* Baill., has also been reported from SE Yunnan, China (Wu and Larsen, 2000; Gao *et al.*, 2005) where it is found in dense forests in mountain valleys at 600-800 m elevation.

During an expedition in southern Vietnam in June 2008, the first author found a *Siliquamomum* species growing quite abundantly at *ca* 1500 m in a moist and shady area of Bidoup Nui Ba National Park. The type material of *S. tonkinense* (*Balansa 4218*, Nov 1887, 4 sheets, P) was located and examined and the original description by Gagnepain (1908) studied. The material collected by us is different in several significant characters and a new species is therefore described below including a colour plate. In addition, a key to the two species of *Siliquamomum* is provided.

Siliquamomum oreodoxa N.S. Ly & Škorničk., *sp. nov.*
Siliquamomo tonkinensi *similis, surculo foliaceo multifolio (foliis 9-13 contra 3), petiolo breviore (ad 2 cm contra 2.5-9 cm longum), laminis minoribus (12-18 × 3-4.5 cm contra 25-42 × 7-12 cm), inflorescentia breviore sed densiore (ad 9 cm longa floribus 8-25 contra 13-15 cm longum floribus ca 12) differt.* – **Typus:** Vietnam, Lam Dong Province, Lac Duong District, Bidoup Nui

Ba National Park, Cong Troi station, along the road between Yang Ly and Hon Giao station, alt. 1449 m asl., 12° 10' 41.9" N, 108° 43' 26.4" E, 14 Jun 2008 (flowering), *Hul & Ly Ngoc Sam 3583* (holo, VNM; iso, E, P, SING with flowers in alcohol). **Figs. 1 & 2.**

Terrestrial **herb** forming loose clumps. **Rhizome** subterranean, branched, *ca* 0.8-1.2 cm in diam., creamy white externally and internally, slightly aromatic; scales papery, brown, triangular scales, *ca* 1-2 cm long. **Leafy shoots** *ca* 3–5 cm apart, 0.9 m long, leafless for about 15-30 cm from the base, with 9-13 leaves per shoot. Leafless sheaths 3-5, yellowish green when young, turning dark brown-green with age, glabrous with dark brown margins. Ligule *ca* 2-3 mm long, bilobed, dark brown, becoming papery and brittle with age, glabrous. Petiole 1-2 cm long, green, glabrous. Lamina elliptic to narrowly ovate, (9.5-) 12-18 × (2.5-) 3-4.5 cm, dark green and glossy above, slightly lighter beneath, apex acuminate, base cuneate, margin entire. **Inflorescence** terminal, peduncle enclosed by leaf sheaths of the pseudostem, terminated by a lax pendulous thyrse with 8-25 flowers, first (lowermost) and second bract at the base of thyrse boat-shaped, 4.5-7 × 1.8-2.5 cm, light green, glabrous, sometimes with a small lamina at the apex, enclosing the budding inflorescence, soon caducous, leaving semicircular scars on the axis, fertile bracts narrowly ovate to elliptic, the bract subtending the lowermost cincinnus the biggest, *ca* 25-30 × 6-8 mm, those subtending upper cincinni usually minute, bluntly triangular *ca* 1-8 × 1-1.5 mm, whitish green, turning papery brown, soon dehiscent (best seen in young inflorescences with unopened buds), axis of thyrse to 9 cm long (measured from the lowermost caducous bract to the top of the axis), to 2 mm diam., light green, glabrous, cincinni 1-3 flowered at the base of the axis, single flowered at the top, bracteoles absent. Pedicel 3-6 mm, *ca* 1 mm diam., light green, glabrous. **Flower** *ca* 5.5 cm long, calyx tubular 18-25 mm long, 6-7 mm diam. at broadest, unilaterally slit *ca* 9-11 mm, translucent white sometimes with a slight pink tinge near margin, glabrous, 3-toothed at apex, teeth 3-5 mm long, 4 mm wide at base, becoming brownish and papery with age. Floral tube 19-21 mm long, white, glabrous at base, sparsely hairy at apex, dorsal corolla lobe elliptic-oblong, concave, 22-27 × 8-10 mm, translucent white, glabrous, lateral corolla lobes oblong to obovate-oblong, concave, 20-24 × 6-8 mm, translucent white, glabrous. **Lateral staminodes** connate to labellum in basal third, oblong-obovate, apex rounded, 19-21 × 11-13 mm, white, glabrous, margin slightly undulate. Labellum obovate, 22-26 mm long, 18-20 mm wide at broadest, apex obtuse to retuse, white at periphery with dark green patch with yellow margins in the centre, adaxially hairy along the midline and green patch, hairs *ca* 1 mm long, white, glabrous abaxially. **Stamen** 15-20 mm long, filament 6-8 × 2-2.5 mm, white, sparsely hairy at base. Anther 9-12 × 3-3.5 mm, attached to filament at 160°, white

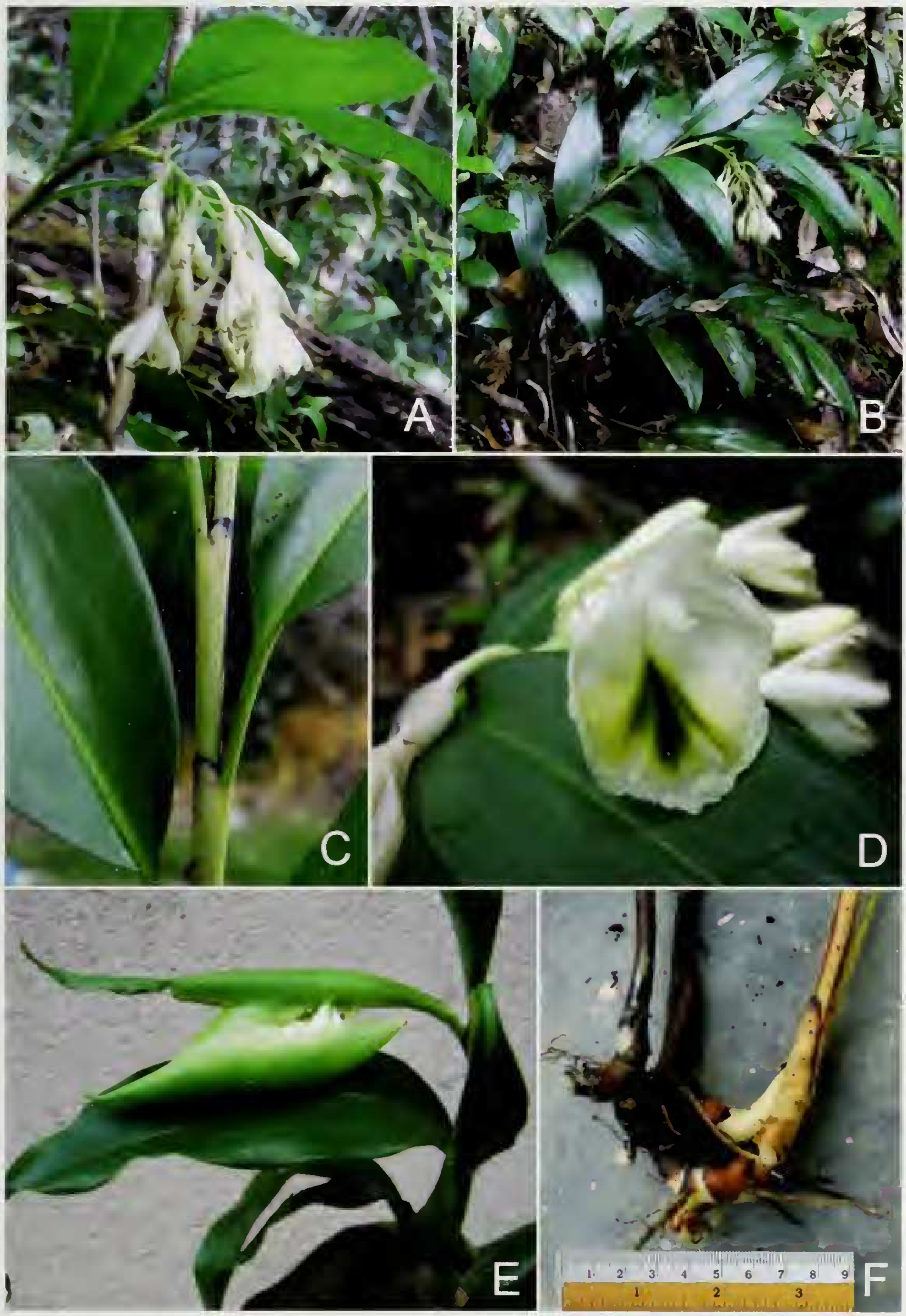


Figure 1. *Siliquamomum oreodoxa*. A. Inflorescence; B. Plant habit; C. Ligules; D. Close-up of flower; E. Sterile caducous bracts enclosing budding inflorescence; F. Rhizome. (Based on *Hul & Ly Ngoc Sam 3583*; Photo by N. S. Ly)

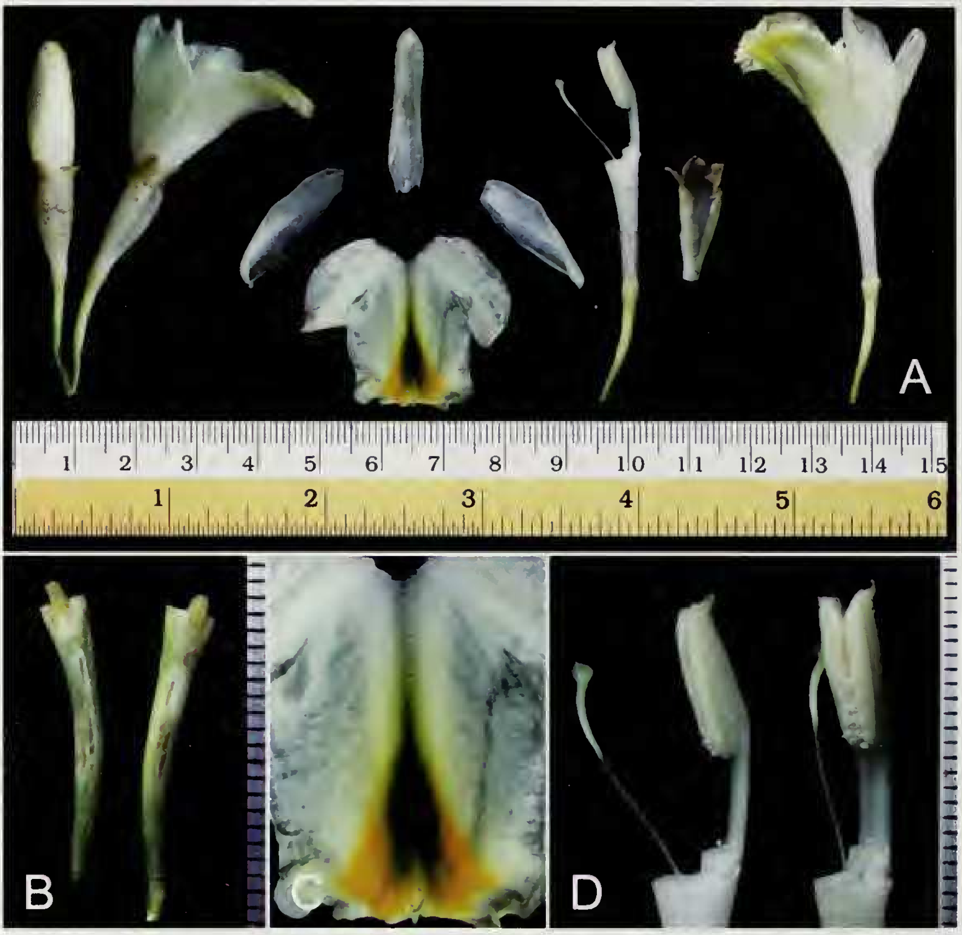


Figure 2. *Siliquamomum oreodoxa.* A. Flower detail and dissection; B. Close-up of ovary dissection; C. Close-up of central part of labellum with hairs along the midline; D. Close-up of anther. (Based on *Hul & Ly Ngoc Sam 3583*; Photo by N. S. Ly).

or light cream, with glandular hairs on connective, apex emarginate, anther thecae 9-11 mm long, white or light cream, dehiscing longitudinally for its entire length, glabrous, each with a minute, tooth-shaped, *ca* 1 mm long crest. **Ovary** narrowly cylindrical, 12-14 mm long, *ca* 1.2 mm diam. at base, up to 2 mm at apex, light yellow-green, glabrous, trilocular, placentation axile. Style 33-36 mm long, white, glabrous, stigma *ca* 1.2 mm diam., club-shaped, top of club ciliate, ostiole ciliate, sub-apical, transverse elliptic, *ca* 1 mm wide, facing forwards to upwards. Epigynous glands two, 2-3 mm long, *ca* 1 mm diam, with blunt apex, cream to very light brown. **Fruit** not seen. All measurements based on living and spirit material of the type.

Phenology: Flowering June to July.

Habitat and ecology: Growing in moist and shady understorey of coniferous and broadleaved mixed forest in Bidoup Nui Ba National Park at 1500-1800 m. This forest type covers most of the Langbiang Plateau (or Lam Vien Plateau) of Lam Dong Province. The prevailing climate in this area is tropical montane with an annual rainfall of 1775 mm and an average temperature of 18°C.

Etymology: Greek *oreo*, "pertaining to mountains" and *doxa*, "glory". We chose the epithet *oreodoxa* because this beautiful species thrives in the mountains. The word *oreodoxus* (*-a, -um*) has often been regarded in botany as an adjective, but in classical Greek it was regarded to be a noun, which, when used as an epithet, cannot be declined.

IUCN assessment: In spite of several surveys of Bidoup Nui Ba National Park and adjacent areas, *Siliquamomum oreodoxa* is only known from the type locality situated immediately adjacent to a camp occupied by members of a minorities ethnic group who have established agricultural fields and built numerous roads to facilitate access to the area. These conditions present a clear threat to the single known population of *S. oreodoxa*. Based on the IUCN Red List criteria (IUCN 2001), we propose a provisional conservation status of Critically Endangered (CR B1ab(iii)+2ab(iii)): D).

Notes: The characteristic features of the genus *Siliquamomum*, based on its previously sole species *S. tonkinense*, include a leafy shoot with few leaves, lax terminal raceme with flowers borne singly, minute bracts, bracteoles absent, petaloid lateral staminodes, each anther theca with an apical linear-acuminate crest and a trilocular ovary developing into narrowly fusiform capsule (e.g., Larsen et al., 1998). *Hul & Ly Ngoc Sam 3583* conforms with all these characters except the higher number of leaves and the fact that the flowers are produced in cincinni of 1–3 flowers. Even though we have not seen ripe fruits, the ovary is conspicuously narrowly cylindrical and identical-looking with ovary of *S. tonkinense.* It is therefore justified to describe the new taxon in *Siliquamomum* and update some of the circumscriptive characters of the genus, i.e., the higher number of leaves and the presence of cincinni.

Siliquamomum oreodoxa differs from *S. tonkinense* by several characters (Table 1), the most important by its leafy shoot with many leaves (9-13 vs. 3), a shorter petiole (to 2 cm vs. 2.5-9 cm), a smaller lamina (12-18 × 3-4.5 cm vs. 25-42 × 7-12 cm), and a shorter and denser inflorescence (up to 9 cm long with 8-25 flowers vs. 13-15 cm long with *ca* 12 flowers).

The flowers of *Siliquamomum oreodoxa* are mostly white, but the labellum has a dark green patch with a yellow border in the centre. The

midline and the green–yellow coloured patch are shortly hairy. The original description of *S. tonkinense* states merely that the flower is yellowish white without any further details but from Gagnepain's drawing attached to the type, it appears that the labellum is glabrous. Based on this comparison, a key to the two species was constructed and is provided below.

Colour pictures of *S. tonkinense* from Yunnan (Gao *et al.*, 2005) show yellowish white flowers, and a labellum with a yellow patch in the centre ornamented with dark green lines. Some of the measurements of *S. tonkinense* from Yunnan differ from those made from type material of Vietnamese origin. Only a comparison of living material re-collected from type locality in Vietnam can shed light on the question, whether the Chinese material is indeed conspecific.

The genus *Siliquamomum* has been traditionally placed in the former tribe Hedychieae (Burtt and Smith, 1972; Smith, 1981; Larsen *et al.*, 1998; now Zingibereae *sensu* Kress *et al.*, 2002) on the account of its petaloid lateral staminodes. The plane of the distichy as observed by us on *S. oreodoxa* is transverse and the pseudostems are evergreen. Both of these features are typical for Alpinioideae, while genera in Zingiberoideae have parallel plane of distichy and most of the species have capacity of going into dormancy during the dry season in monsoonal climates (Kress *et al.*, 2002). The presence of few caducous sterile bracts enclosing the budding inflorescence, is yet another character common in some genera of Alpinioideae. The most recent comprehensive study that dealt with the phylogeny of the whole family Zingiberaceae (Kress *et al.*, 2002) was unable to place *Siliquamomum* in any of the two tribes, Riedelieae or Alpinieae, of Alpinioideae. The study noted that the long silique-like fruits of *Siliquamomum* are similar to those found in the Riedelieae but it differs by the presence of a well developed labellum and lateral staminodes, as well as the absence of the extrafloral nectaries on the leaf midribs. *Siliquamomum* was therefore left as an uncertainly placed genus in Alpinioideae. A later study focusing on molecular phylogeny of *Alpinia* (Kress *et al.*, 2005) placed *Siliquamomum* as sister to the rest of the Alpinieae.

With a second species of *Siliquamomum* collected and described, future sequences may assist in confirming where the genus should be placed and what morphological characters are important for the generic delimitation.

Key to *Siliquamomum*

1. Pseudostem with *ca* 3 leaves; petiole to 9 cm long; lamina 25-42 × 7-12 cm .... ***Siliquamomum tonkinense***
1. Pseudostem with 9-13 leaves; petiole to 2 cm long, lamina 9.5-18 × 2.5-4.5 cm .... ***Siliquamomum oreodoxa***

Table 1. A comparison of characters of *S. oreodoxa* and *S. tonkinense* (based on Baillon, 1895; Gagnepain, 1908; our measurements of type herbarium material marked by *. Characters of *S. tonkinense* from Chinese material stated in Wu & Larsen, 2000, and Gao *et al.*, 2005 are not included).

Characters	*S. oreodoxa*	*S. tonkinense*
Leafy shoot	to 0.9 m long, 9-13 leaves per shoot	at least 0.6 m high, 3 leaves per shoot
Petiole	1-2 cm long	2.5-9 cm long
Lamina	elliptic to narrowly ovate, (9.5-) 12-18 × (2.5-) 3-4.5 cm	ovate-lanceolate, 25-42* × 7-12* cm
Inflorescence	to 9 cm long, with 8-25 flowers	13-15 cm long, with *ca* 12 flowers
Pedicel	3-6 mm long	5-9 mm long
Calyx	18-25 mm long	*ca* 25 mm long *
Lateral staminodes	*ca* 19-21 mm long	*ca* 8-9 mm long
Labellum	obovate, 22-26 mm long, 18-20 mm at broadest point, adaxially hairy along the midline with green and yellow patch, hairs *ca* 1 mm long, white, abaxially glabrous	orbicular, *ca* 12 mm in diam., flowers yellowish white
Anther	*ca* 9-12 mm long	*ca* 11-12 mm long
Stigma	club-shaped	funnel shaped
Ovary	cylindric, trilocular	elliptic, unilocular at apex, 3 locular at base

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